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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/050,334	01/15/2002	Vishnu K. Agarwal	MI22-1913	7861

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EXAMINER

HUYNH, YENNHU B

ART UNIT	PAPER NUMBER
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2813

DATE MAILED: 04/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

14A

Office Action Summary

Application No.

10/050,334

Applicant(s)

AGARWAL ET AL.

Examiner

Yennhu B. Huynh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 November 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 16-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 22-29 is/are allowed.
- 6) ☒ Claim(s) 16-20 is/are rejected.
- 7) ☒ Claim(s) 21 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 112404.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

This Office Action is in response to the Paper filed on 11/24/04.

Claims 1-15 have been cancelled by the Preliminary Amendment filed on 1/15/02.

Currently, claims 16-29 are pending.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/24/04 entered.

Information Disclosure Statement

The information disclosure statement filed on 1/15/02, 5/8/02, 3/19/03, 4/2/03 9/23/03, 3/4/04 and 11/24/04 are being considered by the examiner.

Claim Rejections - 35 USC § 112

Claims 16-21 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

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In claim 16 the limitation "the first electrode not comprising the enhancement layer", which is not described by the specification. The specification is not able for device with the enhancement layer not a part of the first electrode.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 16-20 are rejected as far understood under 35 U.S.C. 102(e) as being anticipated by Al Shareef et al. (U.S. 6,281,543B1).

Al-Shareef et al. disclose a structure of fabrication capacitor method, which include:

-Re. claims 16: A surface area polysilicon enhancement layer 142 over a substrate 126, wherein the enhancement layer 142 having an outer surface area per unit area that is greater than an inner surface area per unit area of the enhancement layer (figs. 8-13); a first capacitor electrode layer 144 (combined by 2 layers: barrier layer 146 and electrode 148) over the enhancement layer, the first electrode having an inner surface area per unit area and an outer surface area per unit area that are both greater than an

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outer surface area per unit area of the substrate; wherein the first electrode not comprising the enhancement layer 142. Al-Shareef et al. reference teaches the capacitor structure is the same with the invention structure. Based upon claim 16 the electrode layer formed over the enhancement polysilicon layer, and wherein the reference also shows the same structure with the electrode 144 formed over the enhancement polysilicon layer 142 in combination with the other limitations read on the featured inventions (fig. 10). Thus, whether the invention discloses that the first electrode not comprising or comprising the enhancement layer, then the reference so does it the same; Al Shareef et al. also disclose a capacitor dielectric layer 152 over the first electrode 144 and a second capacitor electrode 154 over the dielectric layer (figs. 12 & 13, cols. 5 & 6, lines 29-64).

-Re. claim 17: Al Shareef et al. also disclose wherein the first electrode comprised barrier layer is made of TiN (col.2, lines 44-50).

-Re. claim 18: Al Shareef et al. also disclose wherein the enhancement layer comprises rugged polysilicon 142 over the substrate 126, the first electrode being over the rugged polysilicon (col. 5, lines 29-34).

-Re. claim 19: Al Shareef et al. also disclose the rugged polysilicon 142 is formed an annealing not by a doping technique (col. 5 lines 20-34). Al Shareef et al. also do not teaching any where in the reference that the layer 142 is a doped layer. Therefore, the layer 142 is as of an undoped layer. The limitation is presumed to be inherent to the disclosure of Al Shareef et al., per MPEP 2112.01, because their disclosed structure is identical to the invention's structure as claimed in the claim 16

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-Re. claim 20: Al Shareef et al. also disclose wherein the rugged polysilicon comprises spaced between grains of the HSG (fig. 10)

Allowable Subject Matter

Claim 21 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowance: Prior art do not suggest or disclose forming a capacitor, which includes wherein the outer surface area of the first electrode is at least 30% greater than the substrate outer surface area (claim 21).

The limitations of the above claim 21 is neither anticipated nor rendered obvious over prior art of record.

Reasons for Allowance

Claims 22-29 are allowable over the prior art of record.

The following is an examiner's statement of reasons for allowance: Prior art of record does not disclose forming a capacitor construction, which includes the steps of forming a hemispherical grain polysilicon layer over the sides of the opening but not over the bottom, in combination with the other limitations (cls. 22 & 28); wherein forming a surface area enhancement layer comprising undoped rugged polysilicon over a substrate, in combination with the other limitations (cl.27).

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Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

Applicant's arguments filed 11/24/04 have been considered but they are not fully persuasive.

To claim 16 (page, 2): Applicant argues that because the HSG polysilicon layer 142 formed between the double metal layer 144 and polysilicon material 134 then the HSG must be conducted, and it is a part of the first electrode layer 144, in order for a capacitor charge of such electrode electrically connected to drain region 106.

In claim 16 recited limitations wherein the first capacitor electrode formed over and not comprising the enhancement layer. Al-Shareef disclose clearly a dual first capacitor electrode layer 144, which combined two layers 146 and 148 formed over and does not comprised HSG polysilicon enhancement layer 142 (fig. 9 and 10, col. 5 lines 35-41), as being claimed in claim 16. Al Shareef et al. also do not disclose any wherein in the reference that the HSG polysilicon enhancement layer is formed by a doping or a doped layer. Therefore, the layer 144 can not presumed to be conducted. However, the capacitor charge of electrode can be connected to the drain layer 106 through the space between grains of the HSG.

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yennhu B Huynh whose telephone number is 571-272-1692. The examiner can normally be reached on 8.30AM-7.00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr., can be reached on 571-272-1702. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-7724.

YNBH,

030305


CARL WHITEHEAD, JR.
SUPERVISORY PATENT EXAMINER
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